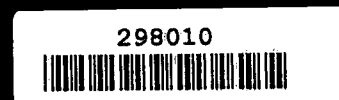


CONCEPTUAL SITE MODEL DEVELOPMENT MEETING

OPERABLE UNIT 4 (OU-4)
CORNELL-DUBILIER ELECTRONICS
SUPERFUND SITE

APRIL 12, 2006



TETRA TECH EC, INC.

CDE Superfund Site OU-4

Project Team

■ EPA

- Pete Mannino Work Assignment Manager
- DESA
- BTAG
- ERT

■ Tetra Tech

- | | |
|------------------|------------------------------------|
| • Lee Haymon | Project Manager |
| • Lynn Arabia | RI Lead (On leave)/Project Chemist |
| • John Schaffer | Acting RI Lead/Eco Risk Assessor |
| • Robert Chozick | FS Lead |
| • Ethan Prout | Hydrogeologist |
| • Jon Gabry | Program QA Manager |
| • Ron Marnicio | Human Health Risk Assesor |



CDE Superfund Site OU-4

Presentation Outline (CSM TOC)

1. Project Objectives and ARARs
2. Site Location and History
3. Environmental Setting
4. Contaminant Sources/Characterization
5. Contaminant Migration Pathways
6. Potential Receptors
7. Preliminary Alternatives/Site Closure
8. Uncertainties
9. Data Needs



CDE Superfund Site OU-4

Project Objectives

- Define nature and extent of contamination in the Bound Brook corridor using Triad approach
- Identify remedial alternatives to address contaminants contributing to excess risk to HH/ECO receptors
- Integrate exit strategy and post remedial recovery



CDE Superfund Site OU-4

Project Specific ARARs/TBCs

- Contaminated Sediment Remediation Guidance for Hazardous Waste Sites
- Final Guidance: Ecological Risk Assessment and Risk Management
- Ambient Water Quality Guidelines
 - USEPA
 - NJDEP
- Sediment Quality Guidelines
 - Consensus Based (i.e., NJDEP, MacDonald, et. al)
 - Equilibrium Partitioning Theory
- Derivation of NJ-Specific Wildlife Values as Surface Water Quality Criteria for PCBs, DDT, and Mercury
- Others



CDE Superfund Site OU-4

Site Background And Location

- Cornell-Dubilier Electronics (CDE) Superfund Site
 - Located in South Plainfield, NJ
 - 26 acre facility operated 1925-1962
 - Former electronic manufacturing facility including capacitors and transformers
 - PCB contaminated oils from dielectric fluids tested by facility for unknown period



CDE Superfund Site OU-4

Site Background And Location

- Cornell-Dubilier Electronics Superfund Site
 - Four Operable Units
 - OU-1 Off-site Commercial and Residential Properties
 - OU-2 On-site Soils and Buildings
 - OU-3 Groundwater and Vapor Intrusion
 - OU-4 Bound Brook Corridor
 - Sediments
 - Floodplain soils
 - Surface water



CDE Superfund Site OU-4

Site Background And Location

- Contaminants detected in on-Site media:
 - PCBs (as primarily Aroclor 1254) max total 130,000 mg/kg
 - Metals
 - Copper 57,600 mg/kg
 - Lead 52,600 mg/kg
 - Selenium 9.7 mg/kg
 - Vanadium 532 mg/kg
 - PAHs max total 23,426 mg/kg
 - VOCs max total 9294 mg/kg
 - Pesticides DDT 25,000 mg/kg
 - Dioxins/Furans max TCDD and equivalents 8.39 mg/kg



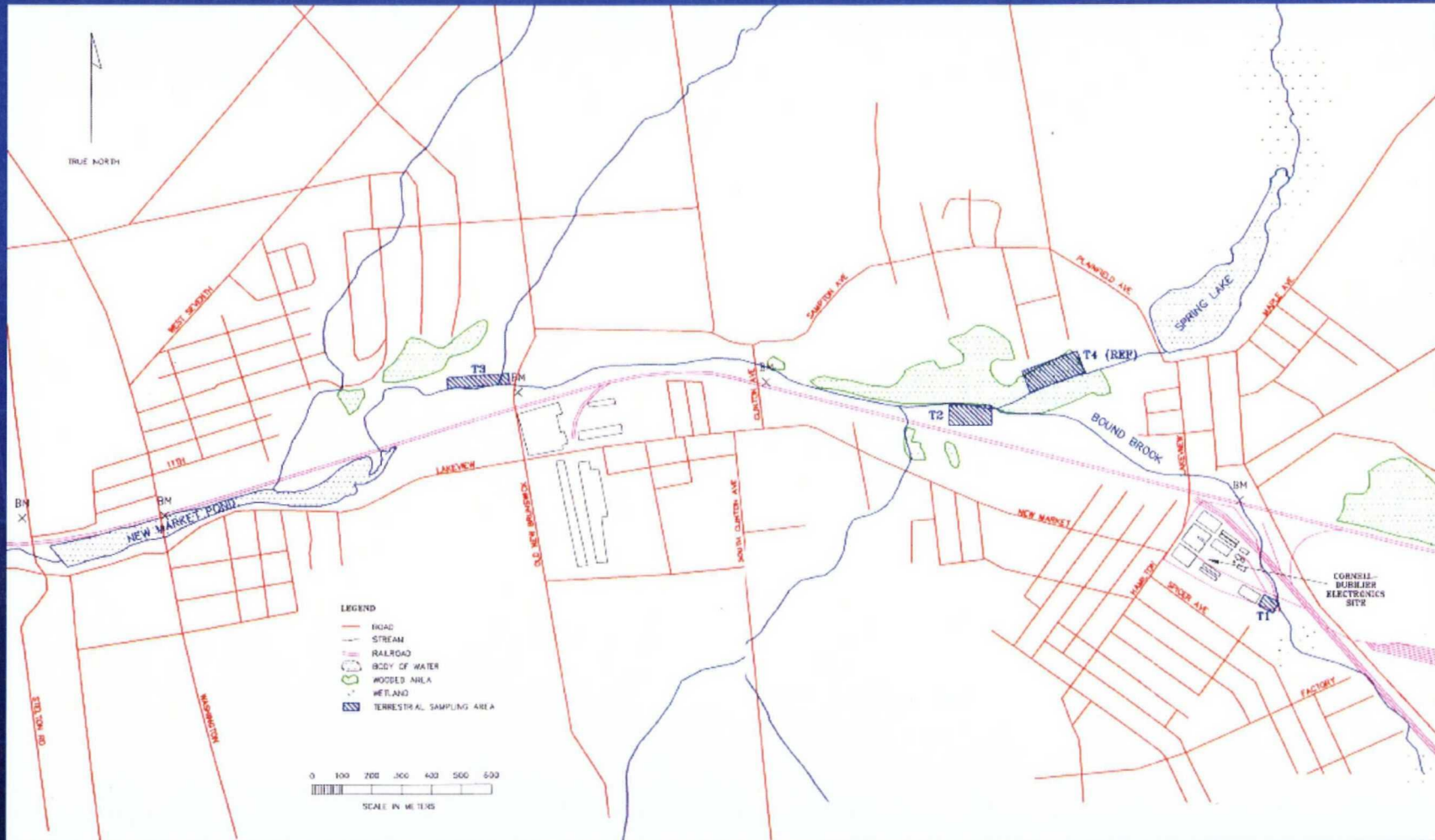
CDE Superfund Site OU-4

Site Background And Location

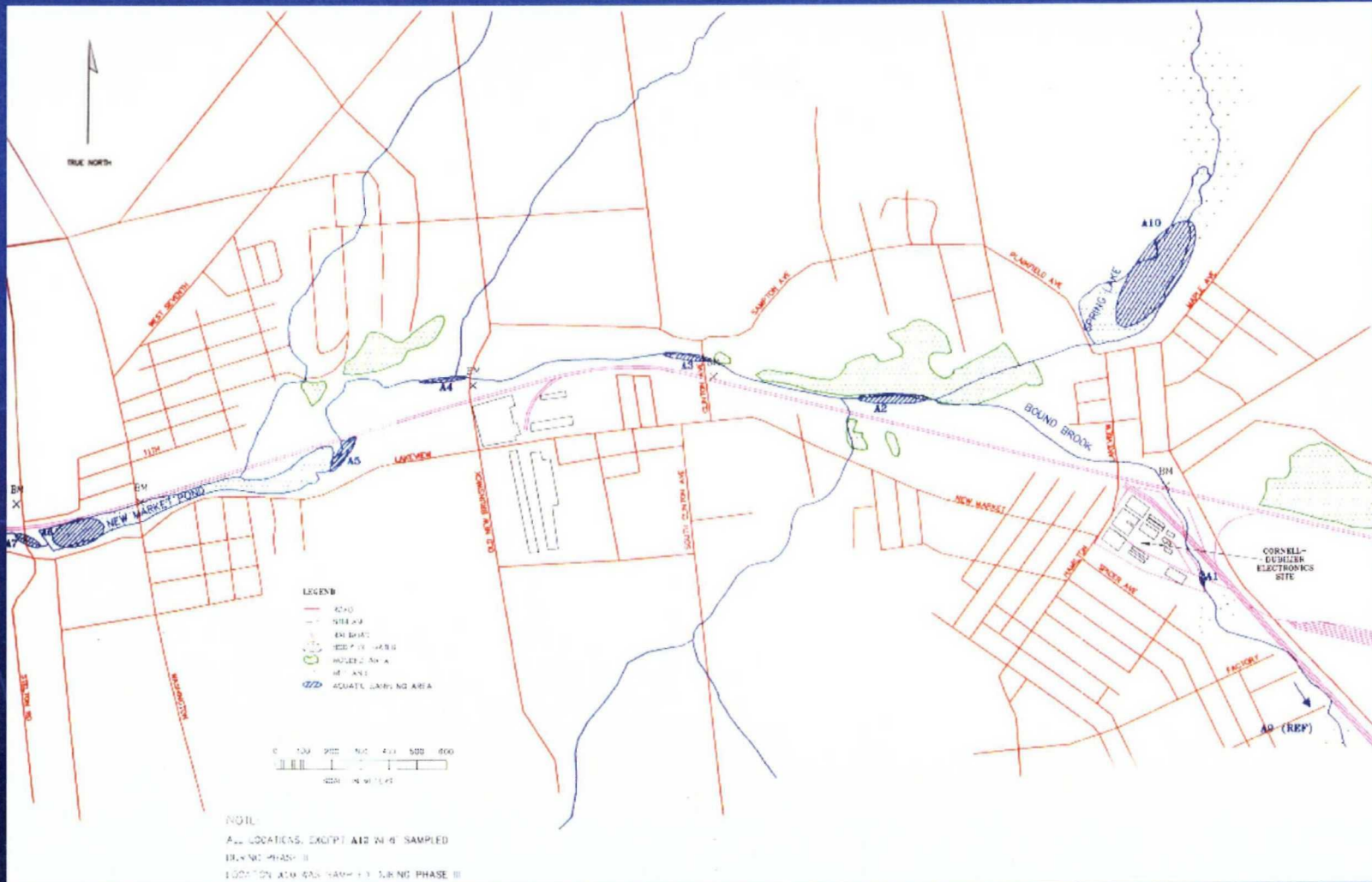
- NJDEP/EPA Investigations of OU-4
 - 1985-1996 NJDEP/EPA conducted multiple sampling events of surface water and sediments in Bound Brook
 - June 1997 EPA Region II initiated a comprehensive study to assess distribution of contaminants in Bound Brook
 - EPA collected samples of surface water, sediments, flood plain soils, fish (fillet and whole), crayfish and small mammals



CDE Superfund Site OU-4 Terrestrial Study Area-EPA



CDE Superfund Site OU-4 Aquatic Study Areas-EPA



CDE Superfund Site OU-4

Historical Data Sources and Reports

- Soil and Sediment Sampling Analysis Summary Report – September 1998
- Ecological Evaluation for CDE Site – August 1999
- Floodplain Soil/Sediment Sampling and Analysis Summary Report – January 2000
- OU-2 On-Site Soils RI/FS – December 2002

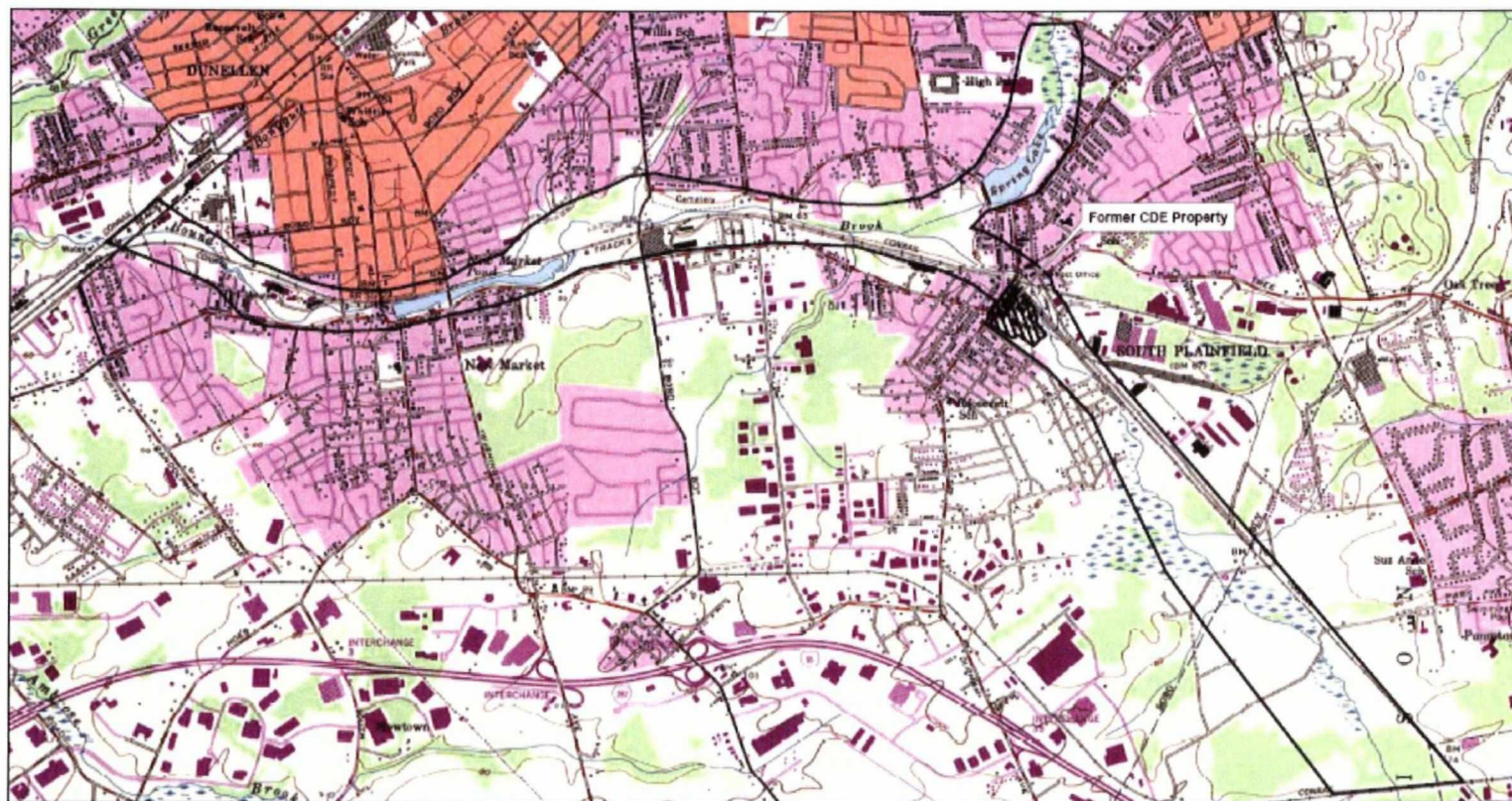


**CDE Superfund Site OU-4
Environmental Setting
Bound Brook Corridor Study Area**

- Boundary extends 3.7 stream miles downstream from facility below spillway of New Market Pond to 2.3 miles upstream of site
- Topography of the stream corridor ranges 60-71 ft. above sea level and is relatively flat throughout.



CDE Superfund Site OU-4 Environmental Setting Bound Brook Corridor Study Area



LEGEND

Approximate Boundary of the OU-4 Project Corridor
 Former Cornell Dubilier Electronics (CDE) Property

Topo Source: National Geographic TOPO. Randstad Geo 4/07/04 at New Jersey 200





TETRA TECH INC.



Operate Unit 4 (OU-4)
Cornell Dubilier Electronics Superfund Site

Figure 2-1
Topographic Base and Site Location Map for OU-4

DEPT	DESIGNED	PREPARED	CHECKED	APPROVED	DATE
SOI	DEPUSH	MUR	WEO	UH	2006
SCALE	DRAWING NUMBER:		SH	OF	REV
AS SHOWN					



CDE Superfund Site OU-4

Environmental Setting – Hydrology

- Bound Brook is a tributary to the Raritan River
- Tributary channel very linear, banks vary from steep to low in over-bank height
- Five small tributaries discharge within the reach defined by OU-4
- Two impoundments, Spring Lake and New Market Pond are associated with OU-4



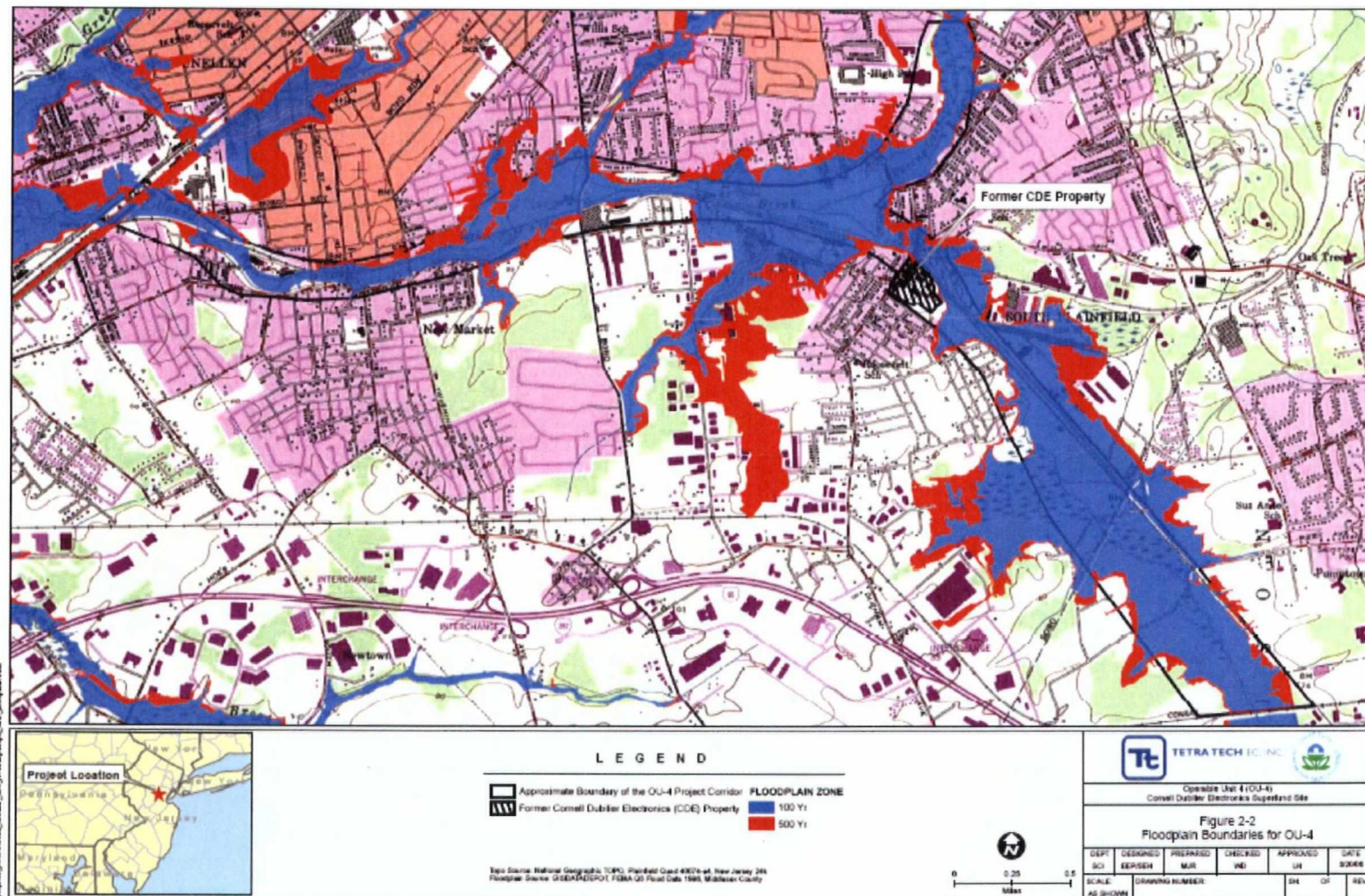
CDE Superfund Site OU-4

Environmental Setting – Hydrology

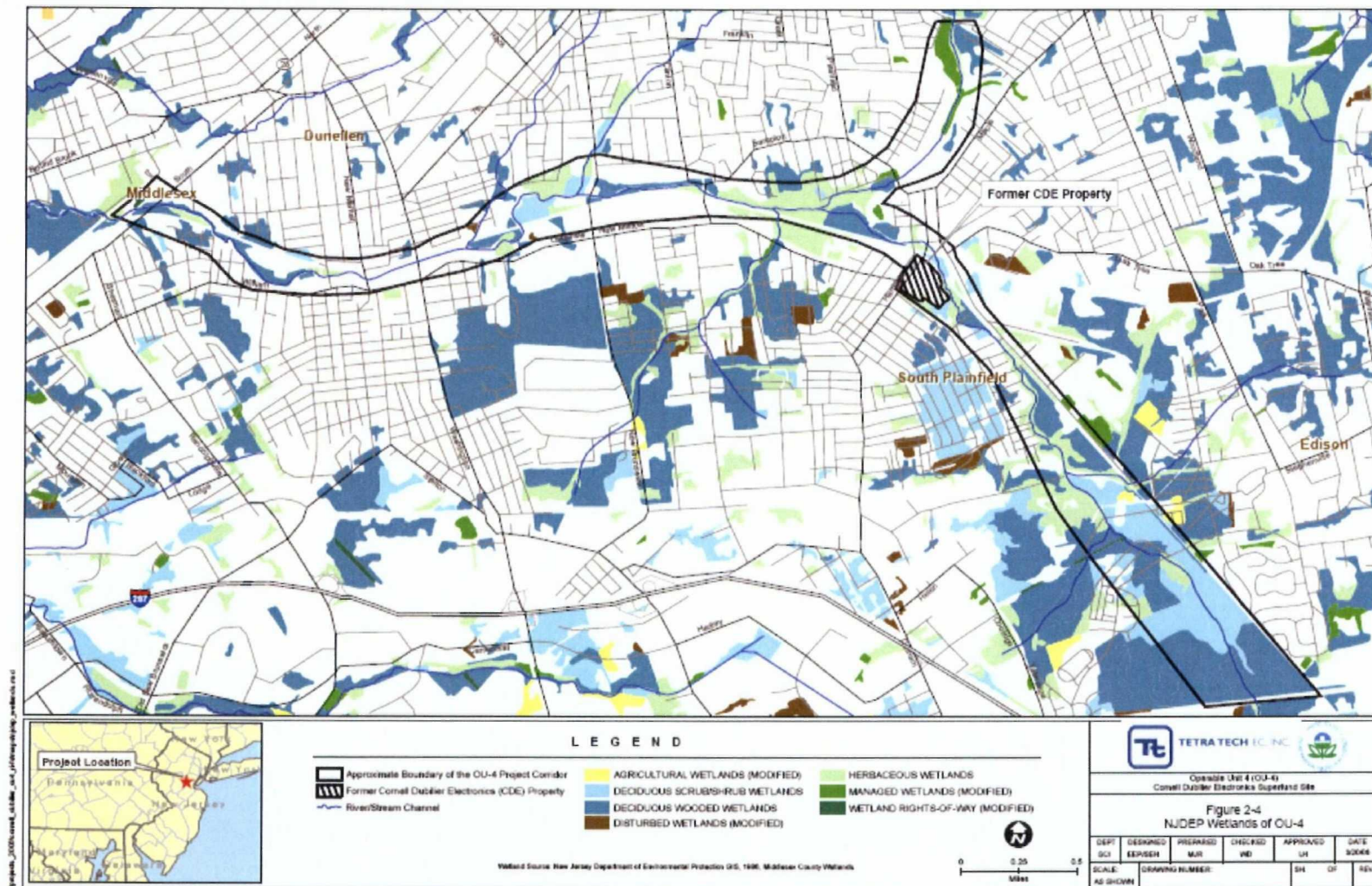
- Discharge highly influenced by urban nature of sub-basins
- Velocity and discharge subject to wide variation and rapid flux
- Hurricane Floyd flooded the brook basin resulting in 15+ ft. in town of Bound Brook in 1999



CDE Superfund Site OU-4 Environmental Setting – Flood Plains



CDE Superfund Site OU-4 Environmental Setting – NJDEP Wetlands



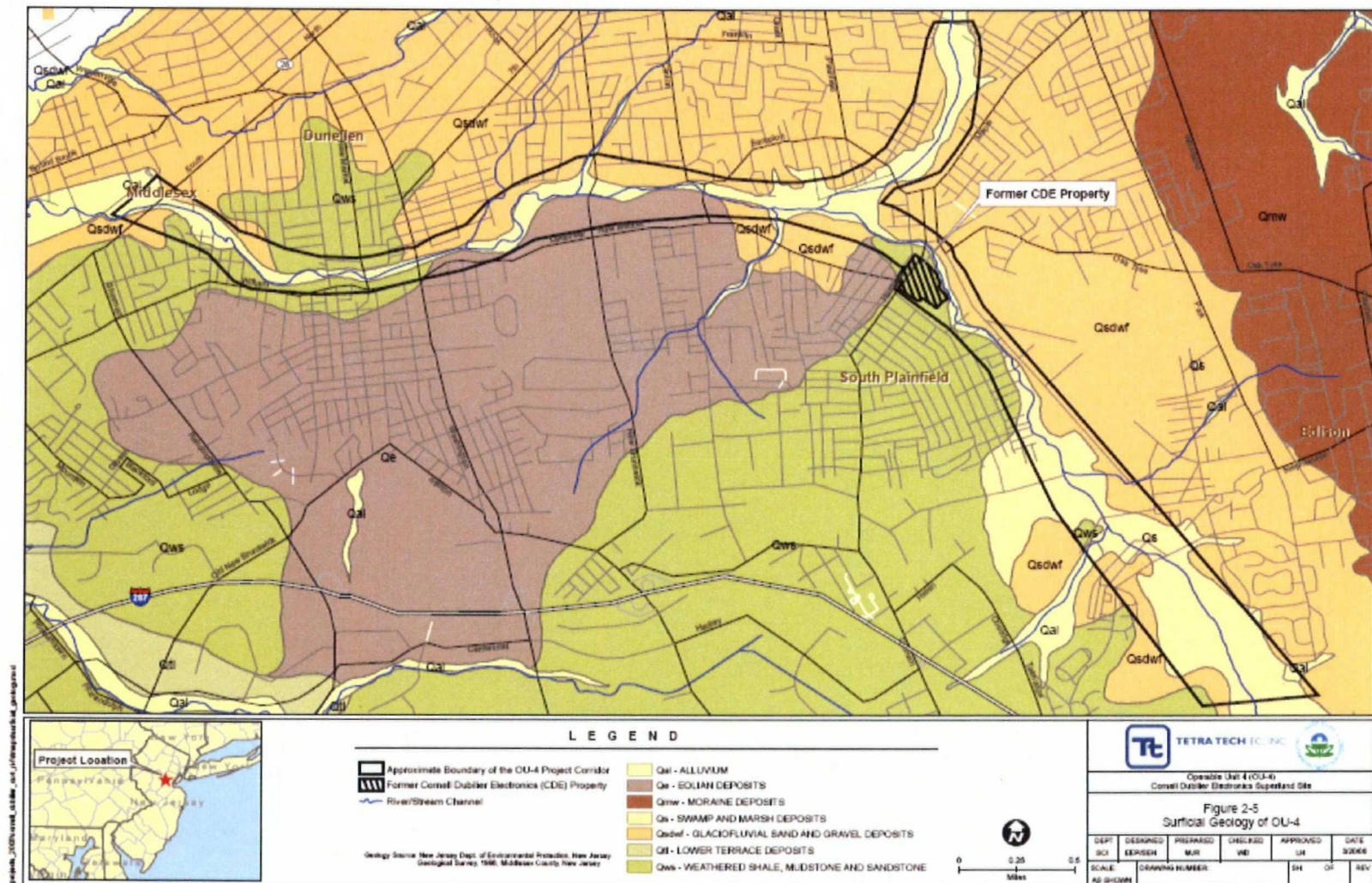
CDE Superfund Site OU-4

Environmental Setting – Geology

- Dominant surficial geology
 - Qs - Swamp and marsh deposits
 - Qsdwf – Glaciofluvial sand and gravel deposits
 - Qws – Weathered shale and mudstone/sand stone



CDE Superfund Site OU-4 Environmental Setting – Surficial Geology



CDE Superfund Site OU-4

Environmental Setting – Hydrogeology

- Passaic Formation with low permeability
- Bound Brook water elevations are generally higher than GW, brook may be recharging the shallow GW aquifer



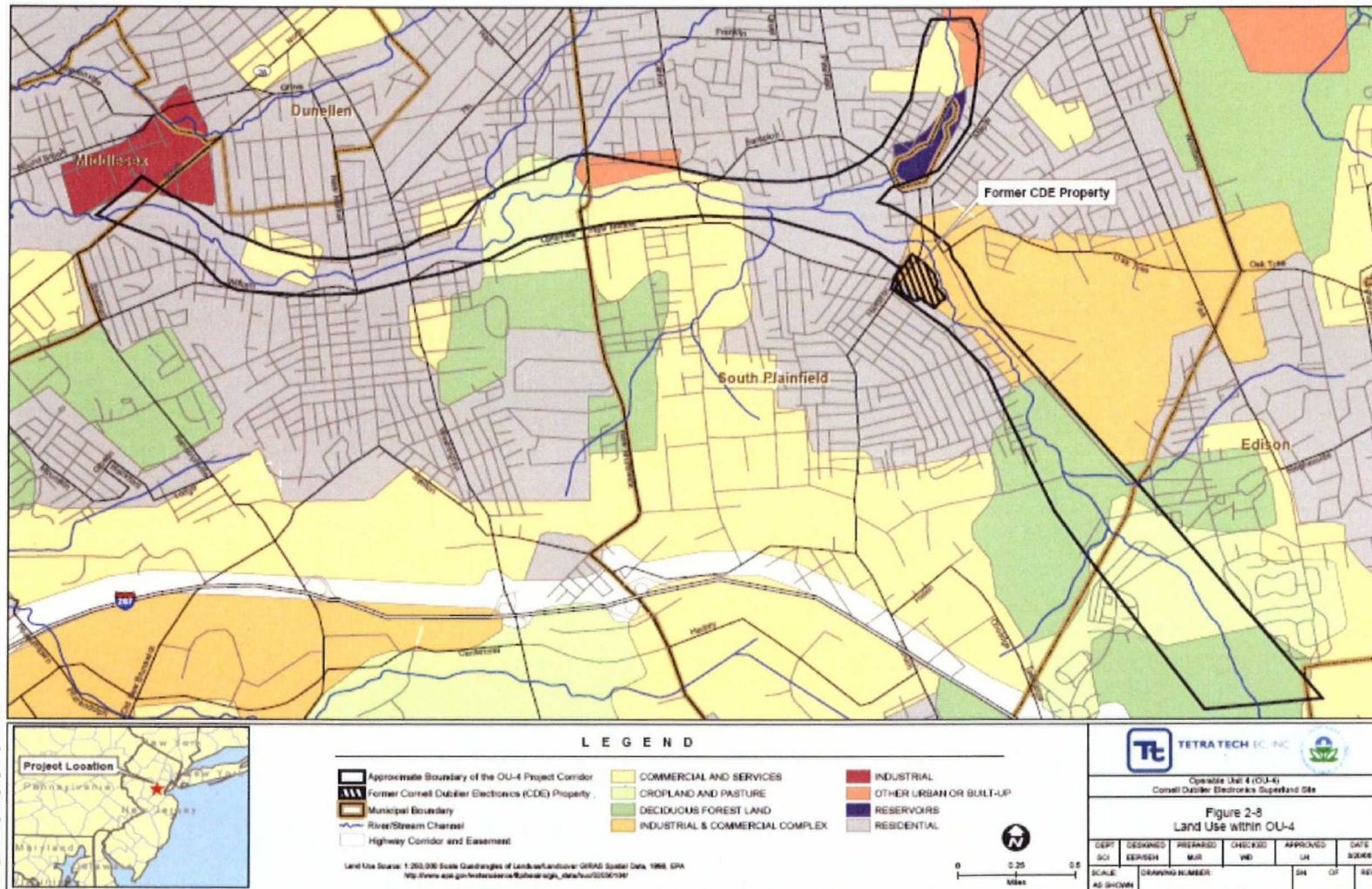
CDE Superfund Site OU-4

Environmental Setting – Land Use

- OU-4 corridor consists of multiple land use types including:
 - Residential (most prevalent land use)
 - Commercial
 - “Green Acres” property
 - Industrial
 - Agricultural



CDE Superfund Site OU-4 Environmental Setting – Land Use



CDE Superfund Site OU-4

Contaminant Characterization for CDE Superfund Site OU-4

- Historical sampling within OU-4 revealed the following:
 - Elevated concentrations of PCBs in wetland/brook sediments
 - Range from non-detect to 830 mg/kg with an exceptional hit of 19,000 mg/kg in backwater wetland area
 - Elevated concentrations of metals, pesticides and SVOCs in brook sediments
 - Elevated VOCs and metals detected in surface water



CDE Superfund Site OU-4

Contaminant Characterization

for CDE Superfund Site OU-4 (continued)

- Elevated concentrations of PCBs in resident fish and aquatic invertebrates from brook and in small mammals collected from the floodplain
- Maximum total PCBs in edible fish
 - Carp 10.9 mg/kg wet weight
 - Largemouth Bass 2.32 mg/kg wet weight
 - Pumpkinseed 6.5 mg/kg wet weight



CDE Superfund Site OU-4

Example Data Plot



CDE Superfund Site OU-4

Contaminant Migration Pathways for CDE Superfund Site OU-4

- Direct disposal of contaminated material into wetland/stream
- Migration/discharge via facility drainage systems
- Migration/discharge of contaminants via overland runoff
- Migration/discharge via groundwater to surface water
- Migration of contaminants via surface water discharge and sedimentary processes in brook
- Bioaccumulation of contaminants by biota



CDE Superfund Site OU-4

Potential Receptors – Human Health

- Recreational Fishermen
- Recreational Swimmers
- Waders/Children
- Construction Workers
- Others



CDE Superfund Site OU-4

Potential Receptors – Ecological

- Fish
- Birds
- Mammals
- Benthic Invertebrates
- Other receptors
 - Amphibians
 - Reptiles
 - Soil invertebrates
 - Plants



CDE Superfund Site OU-4

Environmental Setting – Aquatic Ecology

- Warm water fishery consisting of pollution tolerant fish species. Fish advisory in effect for PCBs
- Benthic substrates highly variable ranging from sand to cobble – infaunal and epifaunal invertebrate communities present
- Water velocity varies widely in reach
- Creation of “backwater area” wetlands



CDE Superfund Site OU-4

Environmental Setting – Aquatic Ecology



CDE Superfund Site OU-4

Terrestrial Receptors

- Fragmented forested areas associated with Bound Brook and floodplain area
- Areas unique given the developed nature of the surrounding land use
- Many species observed tolerant of human disturbance
- Floodplain soils contain PCBs at (ND-580 mg/kg)
- White-footed mice collected from floodplain habitats contained total PCBs <1-5.4 mg/kg



CDE Superfund Site OU-4

Findings of EPA Eco-Risk Assessment

At Risk Communities/Receptors

- Benthic Communities – VOCs, SVOCs, Metals, PCBs
- Fish Communities – PCBs
- Piscivorous Birds – PCBs, Organochlorine Pesticides, Lead
- Omnivorous Mammals – Methoxychlor, Arsenic, Mercury, Selenium, PCBs
- Carnivorous Mammals - PCBs



CDE Superfund Site OU-4

Site Closure/Exit Strategy

- Feasibility Study
 - Risk/Exposure Scenarios
 - Remedial Action Objectives
 - Remedy Selection
 - Long-Term Monitoring/Metrics
 - Potential Contingency Actions
- ROD
- RD/RA



CDE Superfund Site OU-4 **Feasibility Study**

- Develop Remedial Action Objectives
- Identify General Response Actions
- Identify and Screen Remedial Technologies and Process Options
- Develop and Screen Remedial Alternatives
- Detailed Analysis of Remedial Alternatives
- Comparative Analysis of Remedial Alternatives



CDE Superfund Site OU-4

Remedial Action Objectives

- Derived from Conceptual Site Model
- Identify significant exposure pathways for both human health and the environment
- May vary for different portions of the Site and different media
- Identify numerical cleanup standards
- Include discussion of how unacceptable risks are addressed



CDE Superfund Site OU-4

Remedial Technologies

- No Action
- Institutional Controls (ICs)
- Monitored Natural Recovery (MNR)
- Enhanced Natural Recovery (ENR)
- Capping
- In Situ Treatment (innovative)
- Dredging/Excavation



CDE Superfund Site OU-4

Potential Remedial Alternatives

- No Action
- Limited Action (ICs and/or MNR/ENR)
- In Situ Capping
- Removal/Treatment/Disposal
- Combinations of the above into additional remedial alternatives based on Site conditions and media-specific RAOs



CDE Superfund Site OU-4

Analysis of Alternatives

- Considerations
 - Site Closure and Future Uses
 - Degree of Data Uncertainty
 - Overall Risk Reduction
 - Long-Term Monitoring Requirements



CDE Superfund Site OU-4

Uncertainties in Development of CSM

- Summarize uncertainties based upon historical data and reports
- Identify assumption or data gaps that can be addressed to better define exposure and risks to receptors
- Integrate data needs into CSM and reduce uncertainties to better identify remedial strategy
- Integrate into alternatives for remedial planning and a multi-alternative approach



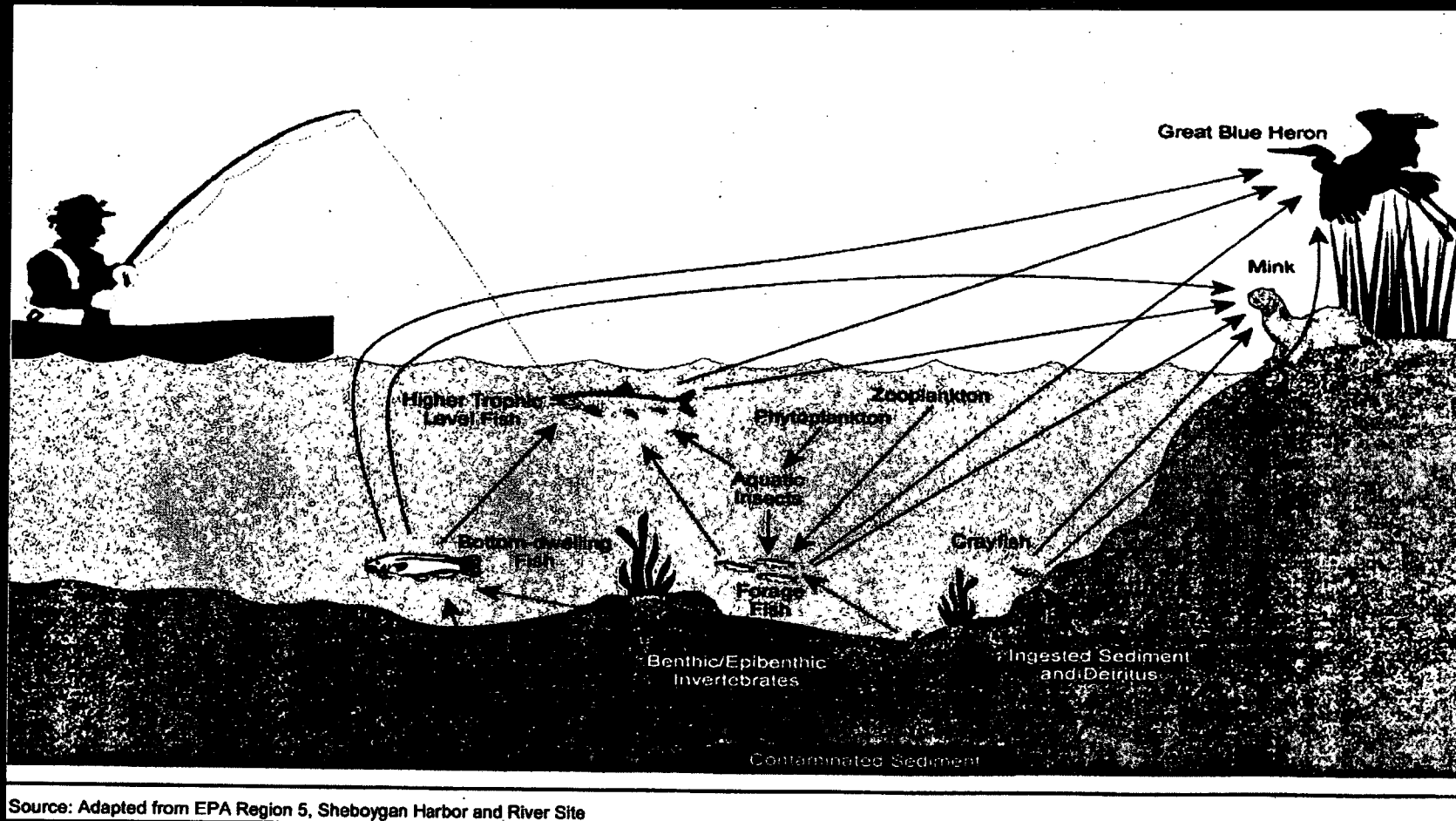
CDE Superfund Site OU-4

Preliminary Data Needs

- Physical
 - Flow Data
 - Depositall vs Erosion Zone Mapping
 - Geotech Parameters
- Contaminant Related
 - Verification Sampling – Pre vs Post Floyd PCB Samples
 - Delineation Sampling – In areas of elevated PCBs (Vertical and Horizontal)
- Chronic toxicity assessment for ecological receptors



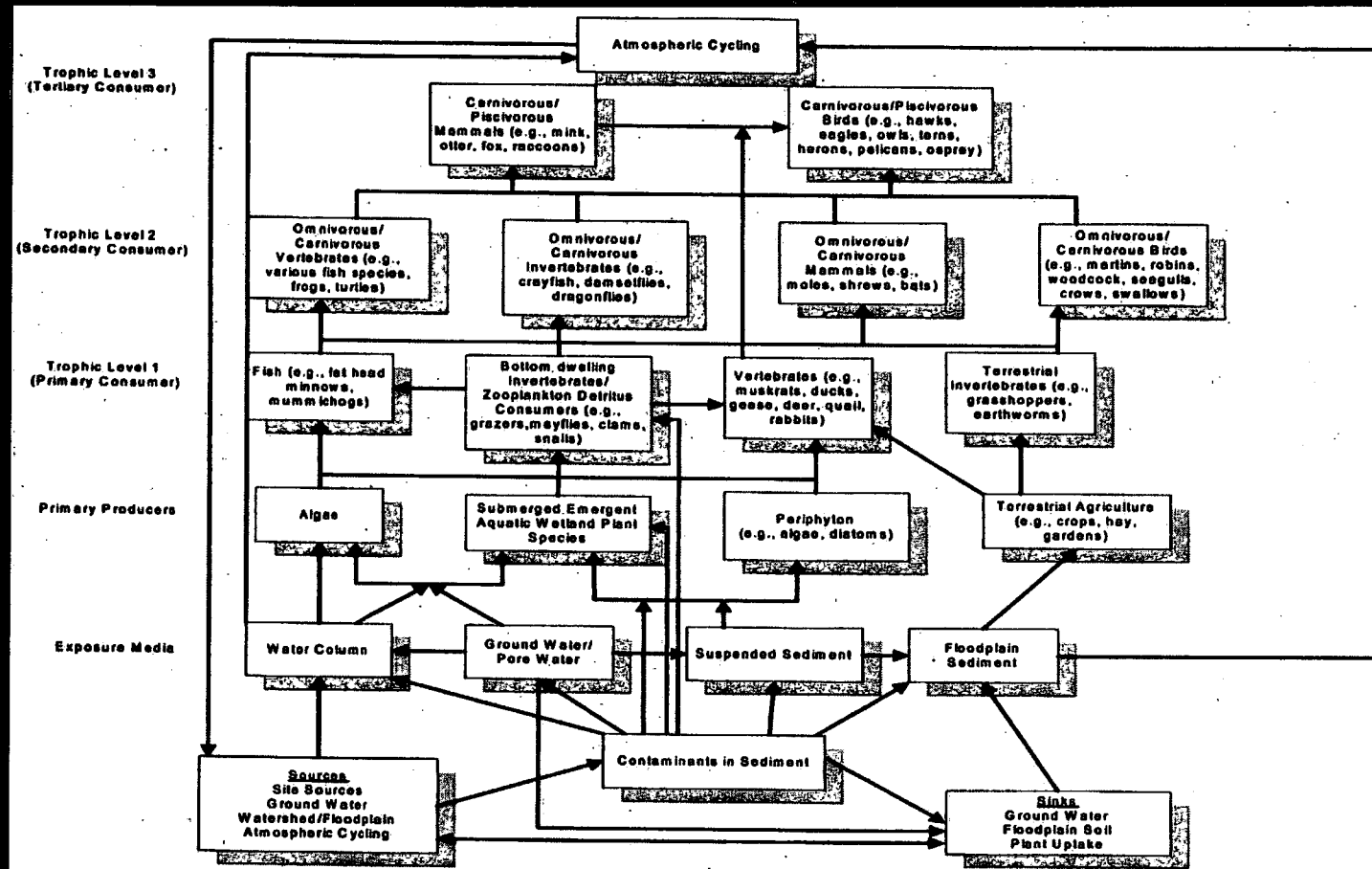
CDE Superfund Site OU-4 Pictorial Conceptual Site Model



Source: Adapted from EPA Region 5, Sheboygan Harbor and River Site

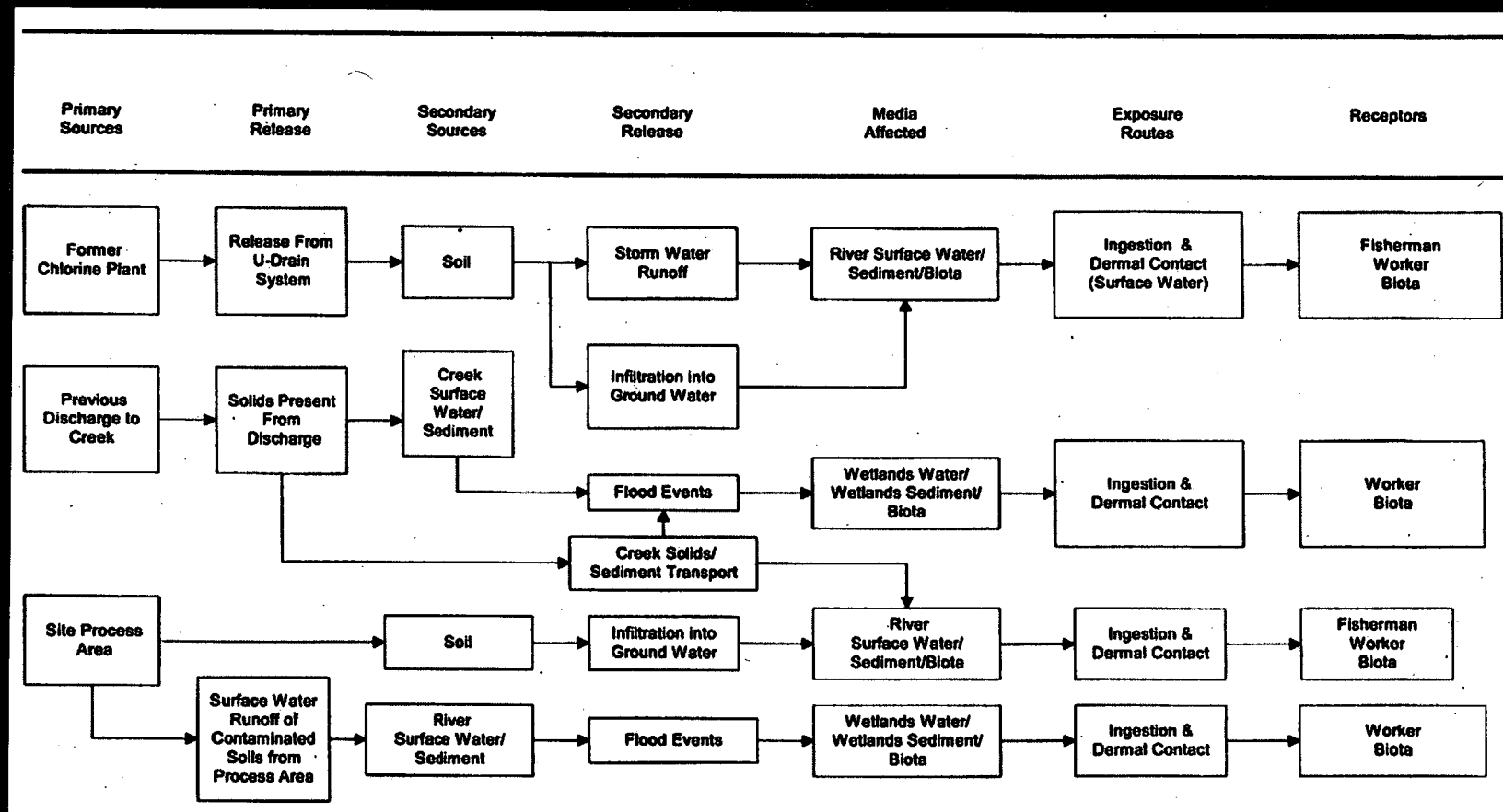
Adapted from: USEPA, 2005. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. Office of Solid Waste and Emergency Response. EPA-540-R-05-012.

CDE Superfund Site OU-4 Conceptual Site Model Flow Chart-Eco



Adapted from: USEPA, 2005. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. Office of Solid Waste and Emergency Response. EPA-540-R-05-012.

CDE Superfund Site OU-4 Conceptual Site Model Flow Chart-HH



Adapted from: USEPA, 2005. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. Office of Solid Waste and Emergency Response. EPA-540-R-05-012.

CDE Superfund Site OU-4

Path Forward

- Complete CSM
- Systematic project planning meeting
- Dynamic work plan preparation
- Implement field program using real-time monitoring techniques and dynamic work strategies
- Evaluate data and address uncertainties throughout field program
- Report results

